Perirenal Transplant Fluid Collections

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ABSTRACT

Various collections can develop in the space surrounding a renal transplant. These collections can present at any point in time from the immediate post transplant period to several months post transplantation and can be incidental or cause significant transplant dysfunction. The use on computed tomography and ultrasound allows for the imaging characteristics of these collections and their relationship to the transplanted kidney to be easily characterized. Standard means of percutaneously accessing the collections to obtain fluid is instrumental in diagnosing their etiology. Urinomas, hematomas, seroma, lymphomas and abscesses can be seen. The management of these collections is dependent on the nature of the peritransplant collection. Optimal care of patients with peritransplant collections is best attained by considered collaboration of a multi-specialty team.

KEYWORDS: Renal transplantation, lymphocele, urinoma

Objectives: Upon completion of this article, the reader should be able to (1) summarize the important imaging findings of peri renal transplant collections, (2) list indications for catheter drainage and sclerosis of peri renal transplant lymphceles, and (3) describe techniques and complications of percutaneous transcatheter lymphocele sclerosis.

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Perirenal transplant fluid collections can be associated with renal transplants at any time in the immediate postoperative period to many months following the procedure. Often these collections are asymptomatic; however, the mass effect can cause symptoms of pain. The collection can impinge on the transplant vascular structures or ureter, causing renal transplant malfunction or iliac veins with sequelae of ipsilateral lower extremity venous hypertension. The time course of the presentation of the fluid accumulation can give some clues to the etiology of the collection. Collections that are identified in the immediate postoperative period may represent urinoma, seroma, or hematoma. Collections that develop later in the weeks to months following the transplantation may represent an abscess or lymphocele. Imaging evaluation with ultrasonography or computed tomography can often demonstrate the size of a fluid collection and its proximity to important structures in the transplant kidney. However, definitive diagnosis of the etiology of the collection is based on analysis of the fluid. Elevated fluid creatinine levels compared with serum creatinine can define urinoma in patients with a functioning renal transplant. If the fluid is not clear, microbiological analysis is mandatory. Fluid from a hematoma or abscess typically has a classical appearance. In difficult situations, nuclear medicine evaluation with a Mag-3 radioisotope renal scan can be helpful in confirming the presence of

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a urinoma by the retention of radionuclide in the collection.

Urinomas are secondary to urinary fistulas or leaks and typically occur early in the postoperative course.[1] Cranston and Little reported a 3% incidence with a mean time of onset of 45 days. The most frequent site of leakage is the ureteroneocystostomy that can be secondary to necrosis of the distal ureter. The urinary leak can be treated with antegrade or retrograde stenting of the ureter with of without percutaneous drainage of the collection. Double-J stents can be placed from the antegrade approach percutaneously or retrograde from the bladder via cystoscopy. Open surgical techniques to manage a urinary leak include anastomosis of the transplant pelvis to the adjacent native ureter and anastomosis of the transplant ureter to the native ureter.

Lymphoceles are well-known complications occurring after transplantation and can be seen in up to 50% of patients.[2] Up to 18% of these collections are symptomatic. Symptomatic collections can appear from 2 weeks to 6 months following transplantation. The term "lymphocele" (lymphatic collection lacking an epithelial lining) originated in the Japanese literature and was described as a complication of pelvic lymph adenectomy by Kobayashi and Inoue.[3] Lymphoceles may result from drainage of the lymphatics divided during surgery to expose the iliac vessels and from injured lymph channels in the donor kidney hilar vessels. Factors predisposing to lymphocele formation include acute allograft injection episodes, acute tubular necrosis, transplant biopsy, retransplantation, and even adult polycystic kidney disease in the recipient.[4,5] More recently, addition of sirolimus to cyclosporin, immunosuppression that is commonly employed in transplant patients, has been associated with an increased incidence of lymphoceles.[5]

There are multiple methods of addressing peritransplant lymphoceles. Simple aspiration results in reaccumulation rates that approach 90% and is therefore not commonly employed. Catheter drainage results in successful treatment of the lymphocele in only 50–87% of cases. Kim et al reported simple catheter drainage resulting in 87% success.[6] Their average treatment lasted 22 days.

Ethanol can be used as a sclerosant. A catheter is placed into the lymphocele after drainage; ethanol is then placed into the cavity and allowed to dwell for 30–60 minutes. This process is repeated every 3 to 5 days. The catheter is removed when the output falls to below 20 mL per day. Zuckerman and Yeager, using ethanol with an average of 19 days of treatment, reported technical success in 30 of 32 (94%) patients with resolution of the lymphocele shown by clinical and imaging findings.[7]

Multiple studies of povidone-iodine have demonstrated 88–100% success. Povidone-iodine can be used as a sclerosant instilled into a cavity in a similar fashion to ethanol.[8] Alternatively, it can be placed into the lymphocele in an open procedure or used prophylactically at the time of renal transplantation.[9] Treatment duration varies from 5 to 35 days.

Manfro et al described acute renal failure in a patient treated with povidone-iodine sclerosis.[10] They recommended monitoring serum creatinine and iodine levels at a minimum when employing this agent.

Caliendo reported 94% success in 18 patients sclerosed with doxycycline that was instilled and removed at the initial catheterization setting.[11] The mean treatment time was 10 days. Bleomycin has been advocated as a sclerosant. It is similar to doxycycline but more expensive. Kerlan et al reported successful treatment of four patients who had undergone unsuccessful sclerosis with alcohol, doxycycline, or povidone-iodine.[12] Talcum is used primarily in sclerotherapy of pleural effusions. Teiche et al described using talcum successfully in a patient with a pelvic lymphocele.[13]

More recently, fibrin glue has been used in conjunction with catheter drainage.[14] The treatment consisted of instillation of a fibrin sealant after catheter drainage of 4 to 7 days resulted in the drainage falling less than 30 mL/day. Human fibrinogen and thrombin were instilled into the cavity through two different lumens of a dual-lumen catheter and the catheter was removed. This resulted in a 75% success rate with 25% requiring a second course of treatment.

Therefore, multiple sclerotic agents have been used with varying degrees of success. No large series have established the benefit of one method of sclerosis over the others. In some centers, percutaneous aspiration of sclerosis has given way to surgical marsupialization.

Surgical approaches to lymphocele include open surgical laparotomy with marsupialization into the peritoneal cavity and more recently laparoscopic marsupialization.[1] Combined percutaneous and surgical procedures include initial needle or catheter access into the cavity for fluid analysis. Methylene blue dye can be placed into the lymphocele, or a guidewire or catheter can be placed through the lymphocele cavity into the peritoneal cavity. Then the patient can be taken to the operating room for laparoscopic fenestration.

Peritransplantation seromas or abscess collections are typically treated with aspiration and catheter drainage; in the case of an abscess, additional treatment with an antimicrobial is warranted. Postoperative hematomas can be aspirated for diagnostic purposes and, if a hematoma is diagnosed, in the absence of infection, catheter drainage is not indicated. A hematoma typically resolves on its own, although in rare circumstances operative evacuation of a hematoma may be required.

In summary, peritransplant collections diagnosed as hematoma, seroma, or abscess are typically addressed with traditional interventional radiology procedures

utilizing aspiration and drainage on a case-by-case basis. Urinomas are more complex, requiring a coordinated approach with operative repair and/or percutaneous drainage. Lymphoceles can be managed with catheter drainage and subsequent sclerosis. Alternatively, they can be addressed operatively with fenestration or marsupialization into the peritoneal cavity with good results. The optimal management of these patients requires a fundamental appreciation of the etiology of these entities, available expertise, and, most important, a collaborative working relationship with the transplant surgeons.

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